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2009

## APOPO Annual Report 2009

Anti-Persoonsmijnen Ontmijnende Product Ontwikkeling

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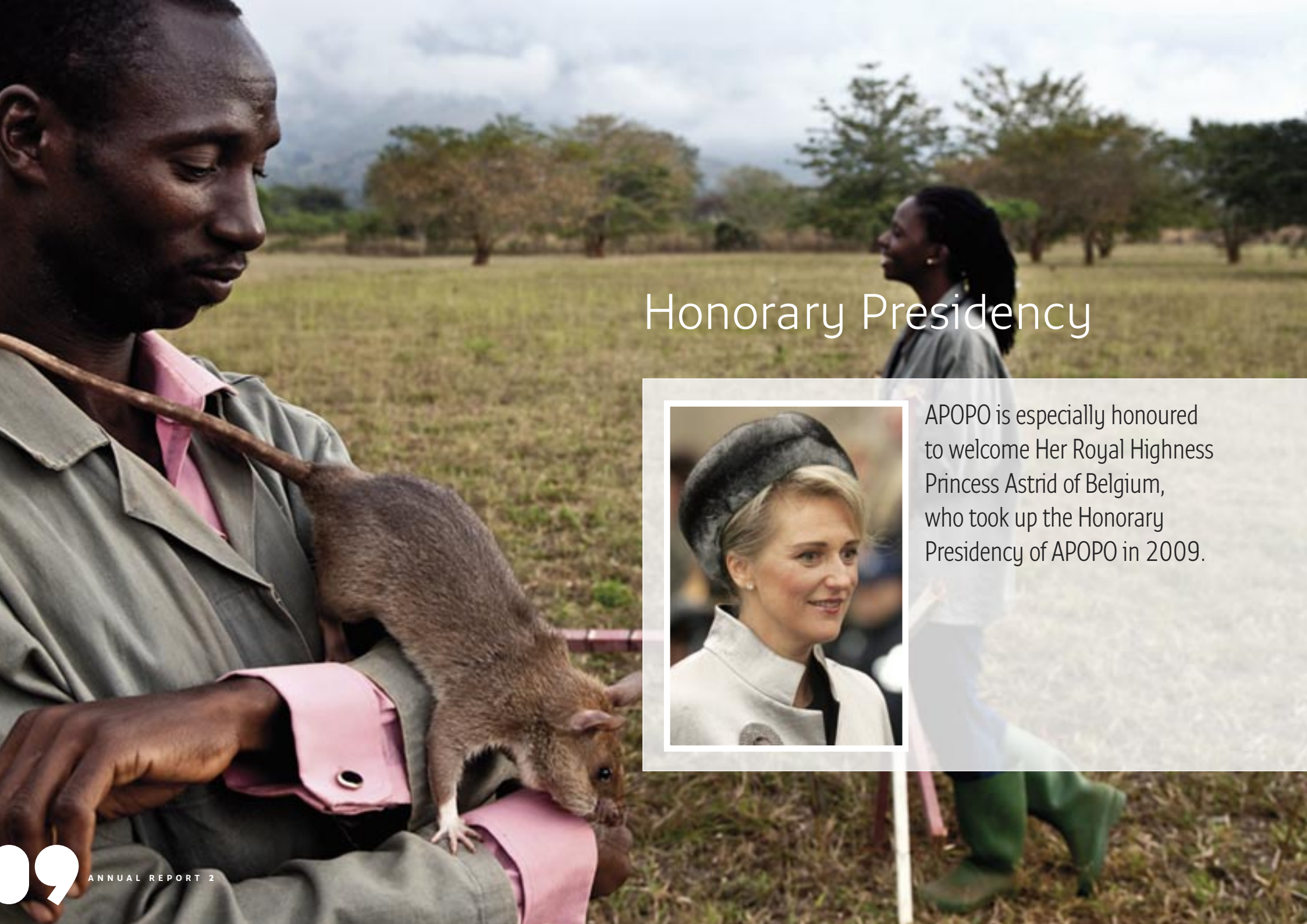
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'Reviled as vermin through the ages, rats are becoming unlikely soldiers in the struggle against two scourges of the developing world: landmines and tuberculosis'.

ANNUAL REPORT 2009





## Honorary Presidency



APOPO is especially honoured to welcome Her Royal Highness Princess Astrid of Belgium, who took up the Honorary Presidency of APOPO in 2009.

# Message from the CEO

In 2009, APOPO has made tremendous progress in reaching its mission to become the Centre of Excellence in detection rats technology and achieving social impact for underprivileged communities and people in Africa.

Implementation of the strategic plan and transformation process, which was started in 2008, has improved both APOPO's internal structure and operational outputs. These changes have strengthened the management team and fostered the formation of strategic partnerships that will provide the basis to further enhance the impact of APOPO's life-saving technology and facilitate the sustainable growth of the organization.

However, the most tangible results of this year can be found in the remarkable improvement of the performance of the Mine Action Programme in Mozambique, and the sharp increase in case finding of tuberculosis (TB) patients.

As a major recognition of the work of APOPO, the Belgian Government approved APOPO's official status as a Belgian Non Governmental Organization (NGO). This new status presents a wide array of opportunities to increase the capacity of APOPO and connect with other organizations that may be interested in working with APOPO.

APOPO is especially honoured to welcome Her Royal Highness Princess Astrid of Belgium, who took up the Honorary Presidency of APOPO in 2009.

In closing, I'd like to welcome all new members of staff and thank the entire APOPO team, as well as its partners and donors, for their enduring work and support during 2009 and the commitments made to the future of APOPO. **Christophe Cox**



The Founder, Bart Weetjens



The CEO, Christophe Cox

## Message from the Founder

In 2009, APOPO continued to transition from a project-oriented and time-bound non-profit organization to a sustainable social enterprise. We have made great strides towards realizing the vision of detection rats technology saving lives. APOPO has provided clear evidence of the value of its technology and is now moving toward a detection service delivery model to increase cost-efficiency of humanitarian mine action operators.

APOPO's key indicators show a steep increase in performance and impact:

- In Mozambique, HeroRATs have proven very cost-effective. During 2009, the cost for APOPO to return mine-suspected land to the original population was \$1.18 per square meter. This is only slightly more than 50 percent of the internationally accepted norm of \$2 per square meter.
- In Tanzania, HeroRATs have increased TB case detection rates in five urban hospitals by more than 30 percent, identified 561 TB patients at first missed by microscopes, and thereby prevented more than 8,000 potential TB transmissions.

These achievements are proof of our potential, and I look forward to seeing this momentum build in the future. With upcoming replications in the African Great Lakes Region, but also outside of the African continent – in Colombia and Thailand – APOPO's Centre of Excellence strategy remains the most direct way for APOPO to catalyze impact.

While implementing, APOPO will continue to focus on research and development, and promotion and management of high quality standards in detection rats technology. Upcoming research and development will focus on further standardization and automation, to allow for replication on a larger scale, and thus maximizing social impact. **Bart Weetjens**



# Table of key indicators

## APOPO key impact and performance indicators

| Outputs  | 2008    | 2009      |
|--|---------|-----------|
| Square meters of minefields cleared (full clearance)                                 | 130,272 | 309,993   |
| Square meters of minefields returned to population (full clearance + land release)   | 130,272 | 719,470   |
| Total square meters of miniefields returned tot population since start of operations | 592,557 | 1,312,027 |
| Mines found and neutralized  | 43      | 169       |
| Unexploded ordinance found and neutralized   | 2       | 181       |
| Small arms and ammunitions found and neutralized                                     | 47      | 3,871     |
| Number of TB samples evaluated by the rats   | 22,281  | 23,624    |
| Number of TB patients detected only by rats and referred for treatment               | 344     | 561       |
| Potential number of TB transmissions prevented                                       | 5,160   | 8,415     |
| Number of rats internally accredited for mine detection                              | 53      | 60        |
| Number of rats operational in mine detection   | 27      | 30        |
| Number of rats bred  | 80      | 109       |
| Outcomes   | 2008    | 2009      |
| Average training duration for internally accredited mine detection rats in days      | 264     | 194       |
| Decrease in training time of rats compared with previous year                        | 17%     | 27%       |
| Total units of professional trainings provided by apopo                              | -       | 87        |
| Price per square meter of minefields returned to population in US Dollars            | 7.31    | 1.18      |
| Number of beneficiaries of mine clearance activities                                 | -       | 44,547    |
| Number of staff employed by apopo  | 117     | 123       |
| Number of volunteers working with apopo  | 2       | 5         |
| Number of Core team volunteers Poppy campagin  | 14      | 14        |
| Total number of web page views - apopo and HeroRat combined                          | 43,549  | 70,047    |
| Countries with operations  | 2       | 2         |
| Number of HeroRat adopters   | 471     | 605       |



Andrew Sully

2009 was a very successful year for the Mozambique Mine Action Programme.

# Mine clearance activities Mozambique

## General perspective on achievements

2009 was a very successful year for the Mozambique Mine Action Programme, seeing a full clearance figure of 309,993 square meters, which was more than double that of the previous year. With the introduction of land release<sup>1)</sup> and improved survey techniques, there was also an additional 409,477 square meters returned back to the community. These excellent results were significantly aided by the purchase of new mechanical equipment, an increase in the number of staff, and the relocation of the office to Gaza Province, our area of operations.

The start of the year saw operations continuing on the large Pumbe minefield in Guija District. With the involvement of the local community, continuing survey work showed that a significant portion of the Suspect Hazardous Area could be released without 'full clearance', and so efforts could be focused on the area actually containing mines. The task was completed ahead of schedule and after approval from the National Institute of Demining, the area was handed back to the community by the middle of the year.

While this task was being completed, it was reported to APOPO that the National Electricity Company of Mozambique (EDM) had come across some mines near the village of Pfukwe, in the Mabalane district. A survey team was deployed to assess the situation and the results confirmed the presence of a small but densely mined area. After discussion with the National Institute of Demining (IND), this was classified as a high priority and the demining team was immediately deployed to the task. An area of only 5,393 square meters was cleared, yielding 32 mines – a density higher than anything previously found by APOPO, and in an area without any apparent strategic positioning. This is a fine example of the complexities of demining in Mozambique, where the normal rules of strategic warfare do not apply, thus making the identification of Suspect Hazardous Areas (SHAs) very complex. The clearance of this land allowed EDM to continue their work on the reconstruction of the na-



tional electricity grid. As a result, the district capital of Mabalane – a town of approximately 10,000 people – is now connected to the national electricity grid.

After the clearance of the Pumbe and Pfukwe minefields, all operations were focused on clearing the five known remaining hazardous areas (tasks) in Gaza province, which were scattered through the districts of Massingir, Chokwe and Chibuto. The known task in the district of Chokwe, however, was inaccessible due to it being on property owned by the Mozambican Army, and talks are still underway to resolve this. As clearance progressed, and with the implementation of Mine Free District Evaluation, further tasks in the areas came to light, and APOPO completed clearance of an additional six tasks.

By October, all known small minefield tasks in Gaza were finished, leaving only the very large task termed the 'Pfukwe Corridor' in Mabalane district and seven road tasks in the northern districts of Chicualacuala, Massangena and Chigubo. Work was started on the Pfukwe Corridor, while the road tasks have been earmarked for survey during the first half of 2010. However,

due to their estimated size, clearance work is expected to continue through until completion in early 2013.

## Capacities

Over the course of the year, the true extent of APOPO's capacity became evident. As a result, the Mozambique Mine Action Programme achieved a significant increase in productivity compared to previous years. It was also seen that if the program expanded slightly, there would be an amplified effect on the amount of Suspected Hazardous Areas being investigated and land returned to the local population.

APOPO increased its capacity in 2009 with the purchase of a Casspir Mine Protected Vehicle, a new Land Cruiser Ambulance, and the employment of more high quality personnel. This was deemed essential in order to be working at the level necessary to complete all designated tasks by 2013.

## Mine Free District Evaluation

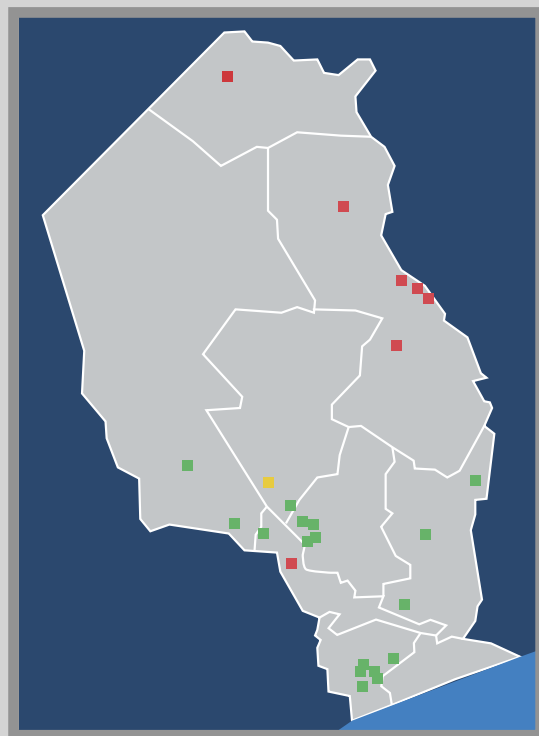
The Mine Free District Evaluation is a process of community liaison and post clearance assessment to confirm areas are free from suspicion as mined areas. It is a technical process, which involves the Survey & Explosive Ordnance Disposal (EOD) team visiting every settlement within the district where demining operations are being undertaken. The team then interviews the community and determines whether there are any remaining suspect areas that present a threat to that population and its livelihood activities. This is conducted as part of the agreed mine free end-state strategy within a given area, i.e. District and Province.

The Survey & EOD Team has completed the Mine Free District Evaluation in both Massingir and Guija. During this process, they have also conducted a significant number of EOD tasks, culminating in a total of almost 250 UXOs destroyed in 2009.

1. Land release methodology offers new and controversial angles to viewing mine action and making decisions on where to use rats, dogs, machines and other assets.

# Gaza current situation

## Visualization (map of cleared areas)



- Gaza cleared Task
- Gaza Tasks remaining
- Gaza Task in progress

## Plan and perspective


The intended clearance plan for Gaza Province is:

| Year | Demining assets<br>/ capacity | Planned clearance |                  | District          |
|------|-------------------------------|-------------------|------------------|-------------------|
|      |                               | No. of Areas      | m2               |                   |
| 2010 | MDR/Manual                    | -                 | 525,000          | Mabalane          |
|      |                               | 1                 | 45,290           | Chicualacuala Rds |
|      |                               | 1                 | 196,000          | Massangena Rds    |
| 2011 | MDR/Manual                    | -                 | 500,000          | Mabalane          |
|      |                               | 2                 | 504,000          | Chigubo Rds       |
| 2012 | MDR/Manual                    | -                 | 500,000          | Mabalane          |
|      |                               | 2                 | 455,000          | Chigubo Rds       |
| 2013 | MDR/Manual                    | 1                 | 500,000          | Mabalane          |
|      |                               | 1                 | 560,000          | Chigubo Rds       |
|      | <b>Total Area</b>             |                   | <b>3,785,290</b> |                   |

This plan is based on the clearance of these areas as if they need 100 percent clearance. The reality is that with further survey work, the actual area of both the Mabalane task and the road tasks is expected to be reduced dramatically. This will allow the completion of Gaza Province to occur in early-mid 2013, if not before. Survey of these tasks will occur during 2010, in order to update the national database at IND, and to optimize future operational planning.

During this time, the Mine Free District Evaluation will continue, with an expected end date in 2011. This will also ensure that any new tasks that arise can be built into the clearance plan, in a timely and efficient manner.



An aerial photograph of a field station in a dry, open landscape. In the foreground, a large group of people, many wearing blue uniforms, are gathered in a circle. Surrounding them are several white vehicles, including a large truck, a smaller truck, and several SUVs. In the background, there are tents and some small structures. The text is overlaid on the right side of the image.

These excellent results were significantly aided by the purchase of new mechanical equipment, an increase in the number of staff, and the relocation of the office to Gaza Province.





# Tuberculosis detection

## Tuberculosis

Tuberculosis (TB) is an infection caused by *Mycobacterium tuberculosis*. As data reported by the World Health Organization (WHO) indicates, TB was responsible for the deaths of 1,800,000 people in 2008. TB currently infects about two billion people and roughly one in 10 of them will become seriously ill with the disease. Most people infected live in developing countries and the disease is especially common in sub-Saharan Africa, where it is the primary cause of death in people with HIV. Despite this, in 2008 only one percent of the people with HIV were tested for TB. A major reason for the scarcity of TB testing in people with HIV, and in the population at large, is the unavailability of a cheap, fast, and accurate test.

The most common diagnostic method used in developing countries is sputum smear microscopy. However, the sensitivity of this method varies widely in published studies, ranging from roughly 20 to 80 percent. Microscopy is especially weak with respect to detecting TB in patients co-infected with HIV. In addition, the method is very slow. According to WHO, one lab technician can only analyze about 20 to 40 samples per day. Other methods, such as Culturing or PCR, are more accurate, but they are even slower and more expensive, and require specialized laboratories that typically are unavailable in resource-limited countries.

Therefore, APOPO continues to explore the use of African giant pouched rats to develop a fast and reliable detection method for TB. While a lab technician can evaluate up to 40 samples in a day, a trained TB detection rat can screen the same number in seven minutes. This allows for inexpensive testing and proactive screening. Currently in Tanzania, fewer than 50 percent of people with active TB are diagnosed with the disease before death occurs. One of the main goals of APOPO's technology is to increase case finding of TB patients, allowing more people to be treated earlier, saving lives and curbing the spread of this deadly disease.

## Results 2009

In 2009 the rats analyzed 23,624 sputum samples collected from five Direct Observation Treatment Short Course (DOTS) centres in Dar es Salaam, Tanzania. These samples, coming from 9,850 patients, were initially analyzed by smear microscopy in the DOTS clinics, then frozen and subsequently checked by the rats.

DOTS centre microscopists found 3,751 positive sputum samples or 15.8 percent of the total, representing 1,560 TB-positive patients. The rats detected *Mycobacterium tuberculosis* in the sputum of an additional 561 patients in whom the microorganism's presence was confirmed by subsequent microscopy at APOPO's laboratory. Thus the rats' use in second line screening increased the new-case detection rate by more than 35 percent.

APOPO has formulated a detailed 3-year research plan to further develop the screening system for first line screening and optimize the performance of the detectors. APOPO teams up with well-established medical research institutions to the required standards of clinical trials in the execution of the research.



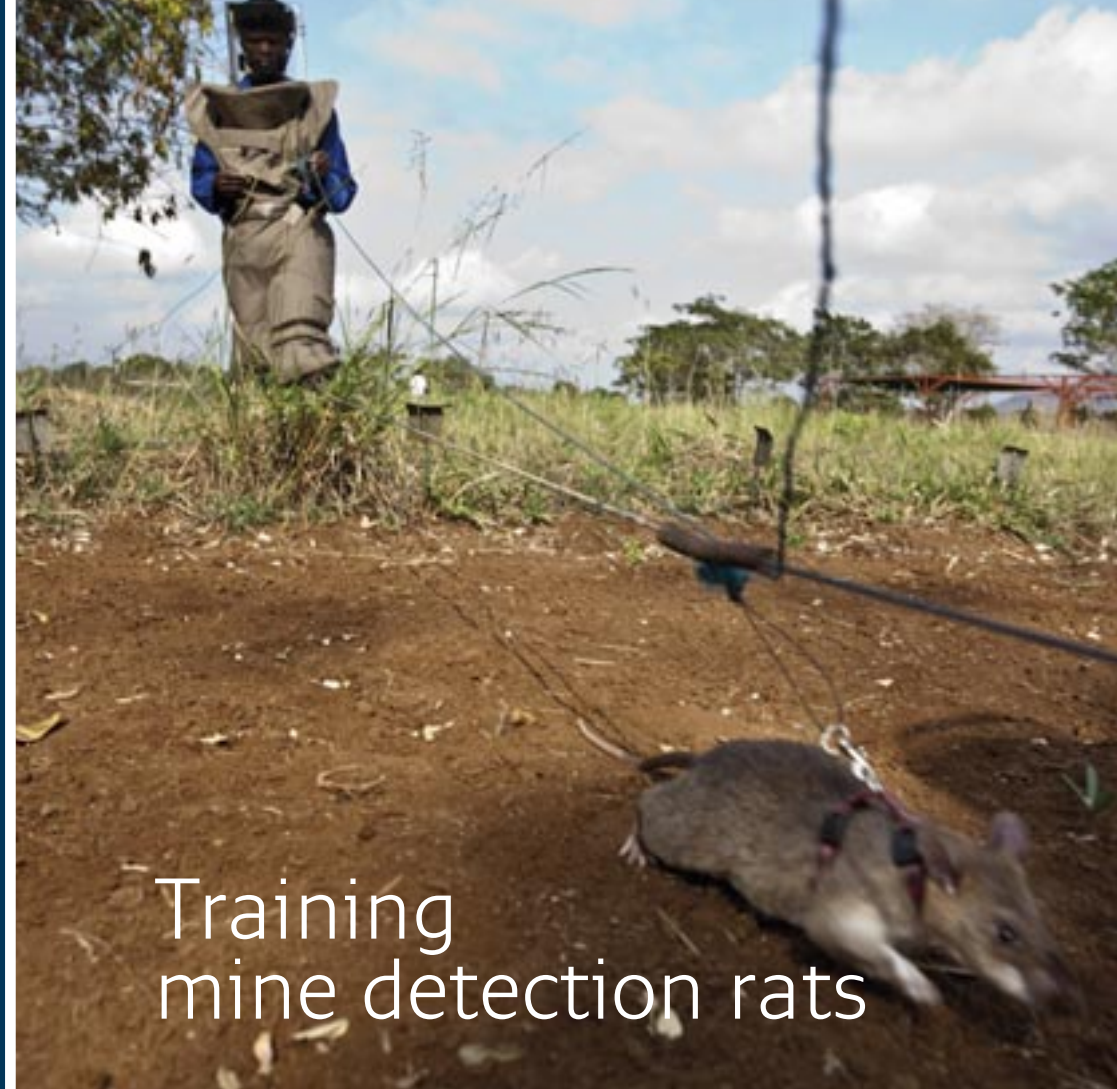
# Remote scent tracing

Apart from the direct detection application in landmines, where the rats actively search for the source of a target odour in the field, detection rats technology is also applied in Remote Scent Detection. In this scenario, odour samples are collected in an area of interest and brought to the rats for evaluation in a controlled environment. This approach has applications for the detection of disease and is being used in our TB project. It can also be used to analyze soil samples from a suspected minefield or scent samples collected from transport containers to detect explosives or contraband.

APOPO has developed several evaluation setups for remote detection by rats. The line cage, in which 10 samples are presented under a stainless steel plate with sniffing holes in a straight line, is one of them.

In 2009, APOPO developed a fully automated line cage. Nose entry detectors were installed in the sniffing holes and the system registers all indications and automatically reinforces the correct indications with a food pellet. If the detection system is to be widely used, it is essential to eliminate the human factor and to make the output registration as well as the timing of the reinforcement precise. The automated cage makes this possible and initial results indicate that it functions well and the rats adjust to it readily.

In collaboration with GICHD and NPA, the REST research effort has also brought us a step closer to a functioning sampler to collect the surface dust from suspected minefields. With the new Mass Spectrometer headspace sampler, APOPO will be able to better define the volatiles emanating from landmines, which will in turn enable us to produce matching training samples.




## Training mine detection rats

### Training mine detection rats

In 2009, APOPO trained a total of 60 mine detection rats that were internally accredited and ready for export. Apart from the increased number of trained rats, the main achievement was a reduction in training time to 194 days on average, compared to 264 days in 2008. Faster training reduces the cost per rat and hence the cost of the mine detection services provided by APOPO.



A brown rat is shown in profile, sniffing a dark, reflective surface. The rat has reddish-brown fur and large, upright ears. In the background, a person in a white lab coat is visible but out of focus. The setting appears to be a laboratory or a controlled environment with a perforated metal wall.

While APOPO's remote scent tracing programme was initially developed to address the landmine problem, it has already proven its usefulness in detecting tuberculosis.

# Perspectives

Havard Bach will join APOPO as the Head of operations, Mine Action and Human Security in May 2010. He has been working closely with APOPO for 11 years as Head of Operational Methods at the Geneva International Centre for Humanitarian Demining (GICHD). During his time there, he has supported a range of different governments and organisations in Asia and Africa and he has been responsible for a variety of operational mine action activities and research projects, including animal detection, use of machines, manual mine clearance and mine action technology. One of Havard's recent core responsibilities with GICHD has been the development of 'land release' concepts and he will be working to develop these concepts into field applications with APOPO.



Havard Bach

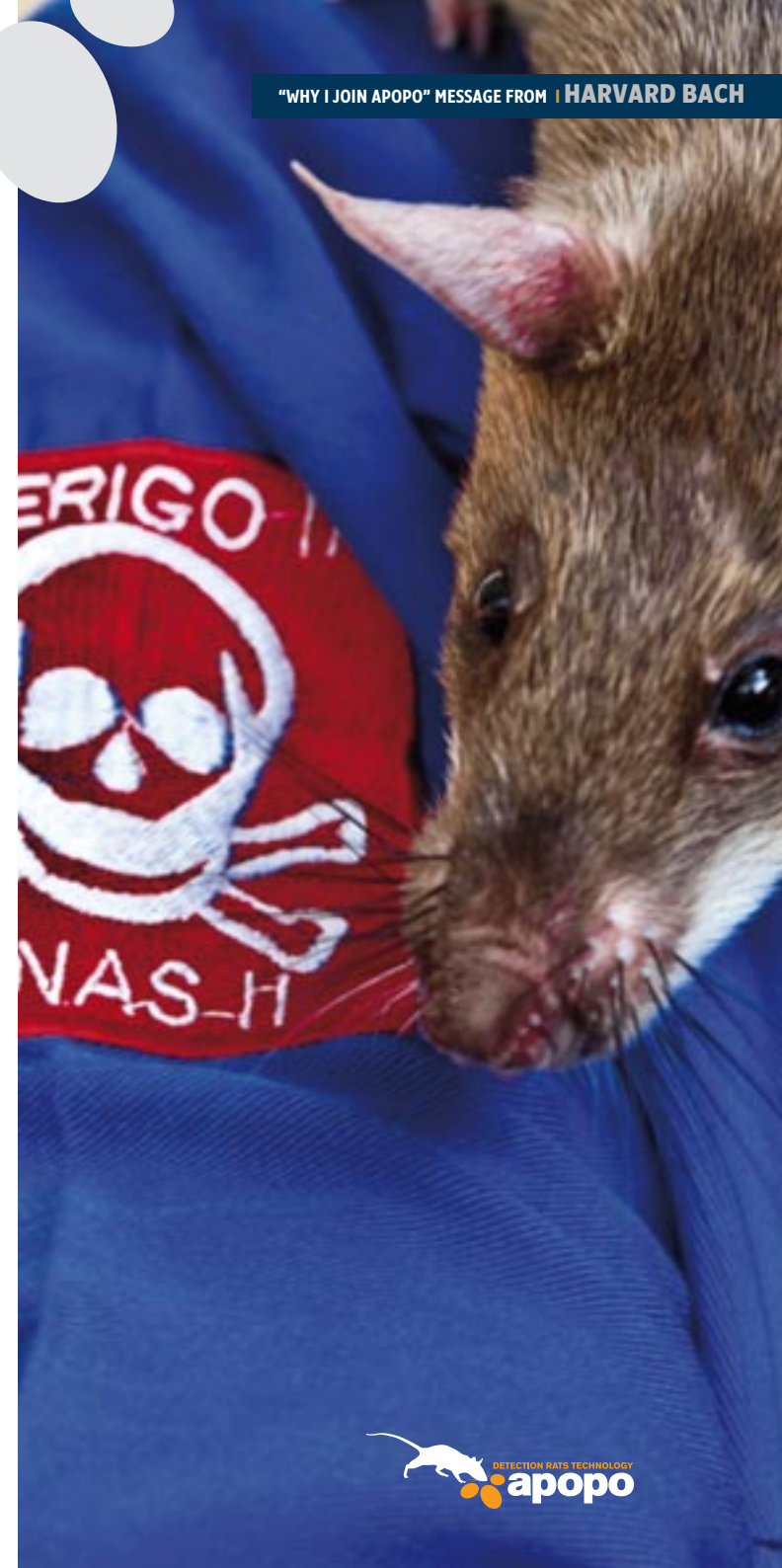
## Message from Havard Bach: Why he joins APOPO and underlining potential for APOPO's detection rats technology in Mine Action and beyond

There is potential for APOPO to play a much greater role within and outside mine action, especially in the areas of land release and remote scent tracing. The absence of a methodology such as 'land release' in the past has resulted in vast areas being cleared that later turned out to be mine free. Developing and making efficient use of land release methodology is a real challenge for the industry and few organisations are truly capable of making the most efficient decisions on where to clear land, and which areas should be released with no need for clearance. There is merit in expanding the role of APOPO to include components of non-technical and technical survey, and the use of complementary assets and practises.

While APOPO's remote scent tracing programme was initially developed to address the landmine problem, it has already proven its usefulness in detecting tuberculosis. There may be many more diseases that could be detected using this technol-

ogy and the system has potential to enhance the wider human and traditional security agenda. Animals are able to detect much lower traces of substances than electronic detection systems but there are certain challenges in using animals that will need to be addressed.

APOPO has been an important and well-regarded partner for GICHD. Through our partnership APOPO has conducted seminal research on environmental factors affecting migration of explosive compounds in soils and aspects of training methodology and equipment development. Elements of this research have lead to real improvements in how the wider mine action industry train and use animals. Because of this long-standing cooperation I already know that APOPO is a small but credible organisation with a team of skilled and motivated people. I am delighted to join the APOPO team and I am looking forward to this new and challenging change of work.





# Main goals

## 2010

In 2010, APOPO will further strive toward reaching its mission to become a centre of excellence in detection rats technology and expand its social impact.

APOPO plans to provide mine detection services to partnering organizations in one or two additional countries. In Mozambique, we will further increase the efficiency of the Mine Detection rats as well as make a detailed study to document the reliability of the mine detection rats.

The TB research will be following the research plan to compare detection rats technology to main stream technologies as well as looking at different possibilities for business models for implementation. APOPO also plans to bring additional medical and behavioural experts on board, while continuing second line screening and case finding.

APOPO plans to further build local capacity in training local staff, and will introduce a new training course for animal trainers including a training handbook and audio-visual package.

Finally, further markets will be explored where the detection rats can improve human security. New technologies are investigated to equip the “Cam-ra-Rat” for search and rescue, and remote scent detection will be elaborated into other applications beyond Mine Action.



# Finances

## Support towards our work

The APOPO management team and members of staff are thankful to all governments, foundations and individuals who have facilitated our work in 2009 by providing financial support, as well as to all of those who have donated their precious time in support of APOPO.

**The mine clearance activities in Mozambique** have been made possible by the financial support of the Belgian Ministry of Foreign Affairs, the Flemish International Cooperation Agency (FICA) and the United Nations Development Program (UNDP). Our work was further facilitated by the purchase of the Casspir armoured personnel carrier and the tree cutter, financed by the income from the Poppy Campaign.

**The training and research activities** of mine detection rats in Tanzania and the program on Remote Explosive Scent Tracing (REST) was directly supported with funding from the Geneva International Centre for Humanitarian Demining (GICHD), the Province of Antwerp and Imperial. Norwegian People's Aid (NPA) further increased the capacity of our analytical chemistry laboratory with the in kind donation of a Mass Spectrometer.

**The TB research and second line screening** was supported by a grant from the UBS Optimus foundation and one from the National Institute of Health (NIH). The Roviralta Foundation facilitated the weekly collection of samples from the DOTS clinics with the contribution of a four-wheel drive vehicle.

The process of **strategic planning and capacity building**, including marketing and business development, received support

through the Skoll Foundation. The Phillipson Foundation financed the strategic support of Virtue Ventures. The LGT foundation supported a fellowship to strengthen the communication strategy and the HeroRAT adoption program. Further appreciation goes to the Lien i3 Challenge who awarded APOPO a grant to implement mine detection rats in Asia, as well as the Flora Foundation, who pledged support for APOPO for the next two years.

**The Poppy campaign** remained active despite the unfortunate loss of its founder Anita Huybens in 2008. Under the lead of her husband, Laurent, and a dedicated team of tireless volunteers, several artistic campaigns and exhibitions were organized throughout the year in all corners of Belgium. The campaign raised over 73,000 € in 2009, which is over half of APOPO's public campaign.



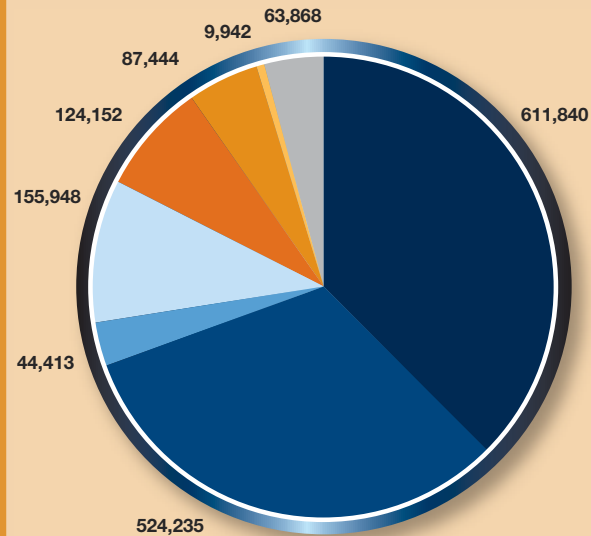
New initiatives can be found on [www.klaprozen.be](http://www.klaprozen.be).

**The HeroRAT adoption program** thanks all its individual and corporate donors for adopting or naming a rat. The HeroRATs team commenced work on the development of a new website and branding makeover, launched in early 2010. The aim of the updated site is to increase the quality of information and communication to supporters of our work. The HeroRAT campaign attracted over 600 adoptions for 2009.





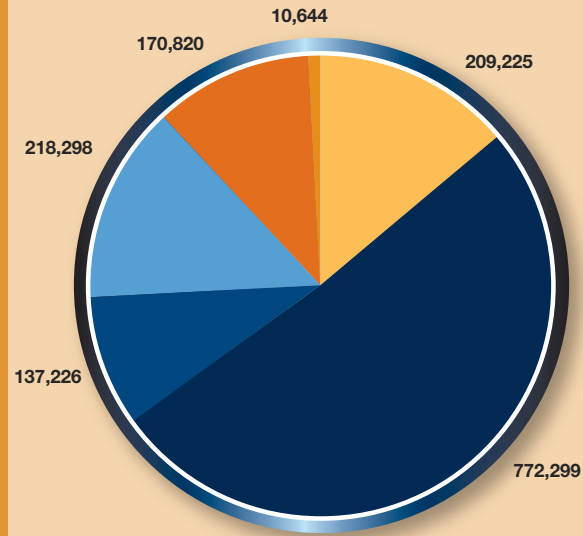
## INCOME APOPO 2009



**Donations and subsidies apopo 2009**  
**TOTAL 1.621.842,- EUROS**

- Government grants (38%)
- Foundations (32%)
- Corporate gifts (3%)
- Technical/research institutes (10%)
- Apopo public campaign (8%)
- HeroRAT campaign (5%)
- Financial gains (0,6%)
- In kind donations (4%)

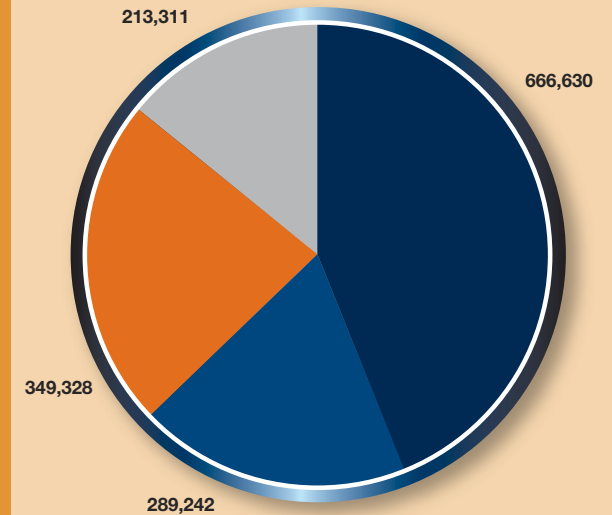
## EXPENSE ITEMS



**Expense items apopo 2009**  
**TOTAL 1.518.512,- EUROS**

- Capital investments and equipment (14%)
- Salaries and professional fees (51%)
- Other personnel costs (9%)
- Supplies and office service (14%)
- Travel and local transport (11%)
- Direct fundraising costs (0,7%)
- Marketing, Business development and Capacity Building (14%)

## EXPENSES PER ACTIVITY



**Expenses per activity apopo 2009**  
**TOTAL 1.518.512,- EUROS**

- Mine Clearance Operations Mozambique (44%)
- Training Mine Detection Rats and REST research Tanzania (19%)
- Training and Research TB Detection Rats Tanzania (23%)
- Marketing, Business development and Capacity Building (14%)

# Finances

## Assets and liabilities

| ASSETS                                      |                  |
|---|------------------|
| <b>Fixed Assets</b>                         | <b>686,434</b>   |
| Land and buildings SUA-APOPO                | 105,599          |
| Furniture, vehicles and equipment APOPO     | 364,021          |
| Furniture, vehicles and equipment SUA-APOPO | 216,814          |
| <b>Current assets</b>                       | <b>1,033,044</b> |
| Receivables within one year                 | 223,231          |
| Cash at hand and in bank                    | 809,812          |
| Other assets                                | 317              |
| <b>TOTAL ASSETS</b>                         | <b>1,719,795</b> |
| LIABILITIES                                 |                  |
| <b>Capital and reserves</b>                 | <b>1,712,637</b> |
| Funds of the organization                   | 328,046          |
| Revaluation of tangible fixed assets        | 513,227          |
| Accumulated profits                         | 246,641          |
| Project grants brought forward              | 624,722          |
| <b>Creditors</b>                            | <b>7,158</b>     |
| Amounts payable within one year             | 7,158            |
| <b>TOTAL LIABILITIES</b>                    | <b>1,719,795</b> |





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